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**Patent and Trademark Office**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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09/616,076      07/13/00      ISHIBASHI

M      NIT-207

EXAMINER

MM91/0913

BEALL LAW OFFICES  
104 EAST HUME AVENUE  
ALEXANDRIA VA 22301

PAYNE, S

ART UNIT

PAPER NUMBER

2881

DATE MAILED:

09/13/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09/616,076

Applicant(s)

ISHIBASHI ET AL.

Examiner

Sharon E. Payne

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 July 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### ***Drawings***

2. Figure 12(a) should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 6 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case graphite is listed as a

Art Unit: 2881

conductor in line 6 of the claim, but graphite is not listed in the specification as a potential conductor.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 8, it is not clear what is meant by "substantially uniform cross-sectional configuration perpendicular to a surface to be patterned through scanning."

In claim 10, lines 17-21, it is not clear what is meant by "configuration processing of a spring section which is formed of said silicon nitride layer, said conductive layer and said vending-correction layer on said silicon substrate and configuration processing of a holder joint part." These terms are not sufficiently defined by the claim.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. Claims 1 and 5 (as best understood) are rejected under 35 U.S.C. 102(a) as being anticipated by Bayer et al. (U.S. Patent 6,088,320).

Regarding claim 1, Bayer discloses the following elements: a tip part (4), a spring section (3) wherein said tip part is so structured that a part of a conductor (4B) thereof is covered with an insulator (6A) wherein said conductor (4B) is so formed as to have a substantially uniform cross-sectional configuration perpendicular to a surface to be patterned through scanning (Figs. 1 and 2).

Concerning claim 5, which depends on claim 1, Bayer discloses a conductor (4B) that is formed in a rectangular parallelepiped shape (Figs. 1 and 2).

***Claim Rejections - 35 USC § 103***

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1, 2, 4, 6, 7 and 9 (as best understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over Van der Weide (U.S. Patent 5,936,237) in view of Applicant's Admitted Prior Art (AAPA).

Regarding claim 1, Van der Weide discloses a tip part and a spring section, wherein said tip part is so structured that a part of a conductor thereof is covered with an insulator (column 16, lines 35-40; Fig. 11b, reference number 292). Van der Weide does not show the conductor being so formed as to have substantially uniform cross-sectional configuration perpendicular to a surface to be patterned through scanning. The Applicant admits on page 25, lines 23-25, that a carbon nanotube conductor is used on a *commercially* available probe. On page 24, lines 10 and 14-15 the Applicant describes the carbon nanotube a conductor as having a tubular shape. A tube appears to have a substantially uniform cross-sectional configuration to the extent that this limitation is understood.

One would only have to replace the probe tip of Van der Weide with the carbon nanotube of the AAPA to make the structure in these claims, which would have been obvious to a person of ordinary skill in the art. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Van der Weide with the conductor of the AAPA.

Claim 2 depends on claim 1 and further requires that the tip part including said conductor and said insulator is formed in a quadrangular pyramid shape having a flat apex at which an apex of said conductor is exposed. The quadrangular pyramid with the flat apex is shown in Fig. 8, and the conductor is shown in the AAPA.

Concerning claim 4, it depends on claim 1 and further requires that in the tip part including said conductor and said insulator, said conductor is formed in a cylindrical shape disposed along the center of said tip part, and the entire periphery of said conductor is covered with said insulator. The Applicant identifies Fig. 12a as a diagram of a *commercial* probe having a carbon nanotube conductor (page 25, lines 23-28 of the specification). Fig. 12a discloses the carbon nanotube conductor (135) at the center of the tip part. The AAPA does not disclose the entire periphery of the conductor being covered with the insulator. Van der Weide discloses the periphery of the conductor covered with the insulator (292) in Fig. 11b.

Claim 6 depends on claim 1 and further requires that the conductor be made of a hard conductive material selected from a group that includes the carbon nanotube. On page 24, lines 25-28 of the specification the Applicant admits that carbon nanotube probes are commercially available, making them prior art. Since the claim requires one to select only one of the materials, this claim is defeated by the AAPA.

Concerning claim 7, it depends on claim 1 and further requires that the insulator is made of one of a group of materials including silicon nitride. Van der Weide discloses the use of silicon nitride as the insulator on a probe (column 9, line 43). Since the claim only requires that one material be chosen, the disclosure in Van der Weide defeats the claim.

Claim 9 depends on claim 1 and requires that the spring section be a cantilever or a double-end-support type. In Fig. 1, Van der Weide discloses a cantilever probe.

Since the claim only requires that one option be chosen, the disclosure of Van der Weide defeats this claim.

12. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bayer in view of Binnig (U.S. Patent 6,079,255).

Claim 3 depends on claim 1 and further requires that the tip part including said conductor and said insulator is formed in a hemispherical shape with an end of said conductor exposed at the zenithal point thereof. As discussed earlier, Bayer discloses the probe comprising a conductor and an insulator. Bayer does not show a hemispherical probe. Binnig discloses a hemispherical probe (14, Fig. 1B). It would have been obvious for a person of ordinary skill in the art to use the hemispherical probe of Binnig in the probe structure shown by Bayer to provide the desired contact with the substrate as the probe is flexed; see Fig. 3C of Binnig. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Bayer with the probe shape of Binnig.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bayer in view of Gueret (U.S. Patent 5,360,978).

Claim 8 depends on claim 1, which is unpatentable for the reasons specified above. Gueret discloses a plurality of mutually insulated conductors provided in said tip part (41, 46, 50), and wherein a potential for patterning is fed to one of said plural conductors or a combination thereof (abstract) in an application of lithographic



Art Unit: 2881

processing (column 4, lines 14-16). A person of ordinary skill in the art would easily combine the mutually insulating conductors of Gueret with the probe in Bayer to have the option of choosing between a plurality of conducting layers. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Bayer with the mutually insulated conductors of Gueret.

14. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maddix (U.S. Patent 6,232,143) in view of Fujiu (U.S. Patent 5,537,863).

Maddix discloses the following steps: preparing a silicon substrate (10) having a predetermined crystal orientation, and opening a predetermined hole therein (Figs. 1A-1D); forming a silicon nitride layer (92) having a predetermined thickness on said substrate (Fig. 16A); opening at the center of a hole shape arranged on said silicon nitride layer, a pit having a predetermined configuration which extends to said silicon substrate (Fig. 16A, hole for probe tip point 21); forming a conductive layer (23) having a predetermined thickness on said silicon nitride layer (Fig. 16A); forming a vending-correction layer (94) having a predetermined thickness on said conductive layer (Fig. 16A); forming said spring section into a predetermined cantilever shape (Fig. 16A); forming a holder (28) at the base of said cantilever shape (Fig. 16A) and removing said silicon substrate from said silicon nitride layer (Fig. 2A—silicon substrate 10 is removed).

Maddix does not disclose carrying out, after formation of said vending correction layer, configuration processing of a spring section which is formed of a silicon nitride layer, said conductive layer and said vending correction layer on said silicon substrate, and configuration processing of a holder joint part. Fujiu discloses these steps in column 7, lines 35-55.

One only has to take the apparatus disclosed in Maddix, process the spring section and add a holder joint part as disclosed in Fujiu. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Maddix with the process of Fujiu.

### ***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Saito discloses a probe device for a memory device having multiple cantilever probes.

Maddix (U.S. Patent 6,014,032) discloses a micro probe ring assembly and method of fabrication.

Kawase discloses a trapezoidal microtip and a process for preparation thereof.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharon E. Payne whose telephone number is (703) 308-2125. The examiner can normally be reached during regular business hours.


Application/Control Number: 09/616,076

Page 10

Art Unit: 2881

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sep  
September 4, 2001

  
KIET T. NGUYEN  
PRIMARY EXAMINER